

CLAIMS

1. A process for modifying CNSL comprising subjecting the CNSL to ozonolysis to form ozonolysis reaction products followed by reduction of the ozonolysis reaction products to give a mixture of phenolic components and aldehydes.  
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2. A process for modifying CNSL which comprises the steps of first reacting CNSL with ozone to form a mixture containing ozonolysis reaction products, and secondly treating the mixture under reducing conditions to form a further mixture  
10 containing phenolic components with an eight carbon chain having a terminal CHO group and alkyl components of varying lengths with either one or two terminal CHO groups.
3. A process according to claim 1 or claim 2 wherein the ozonolysis reaction  
15 products are reduced using metals (such as transition metals) in the presence of acid, or reducing sugars, or catalytic hydrogenation, or reduction using a reducing agent selected from iodide (e.g. sodium, potassium, calcium) in the presence of acetic acid; dimethyl sulphide; thiourea; triphenyl phosphine; trimethyl phosphate and pyridine.  
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4. A process according to claim 3 wherein the reducing agent is zinc and acetic acid.  
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5. A process according to claim 3 wherein the reducing agent is a reducing sugar such as alpha D-glucose.
6. A process for modifying CNSL, comprising the steps of first reacting CNSL with ozone to form a reaction product, and secondly treating the reaction product with a reducing sugar so as to form a mixture containing phenolic components with an  
30 8 carbon chain having a terminal CHO group, and alkyl components with either one or two terminal CHO groups.
7. A process according to any one of the preceding claims wherein the ozonolysis is conducted in a solvent comprising an alcohol, preferably ethanol.

8. A process according to any one of the preceding claims comprising the further step, following the reduction step, of separating phenolic aldehydes and alkyl aldehydes formed during the process.
- 5 9. A mixture of alkyl aldehydes formed by the ozonolysis of CNSL and subsequent reduction of the resulting ozonolysis reaction products.
- 10 10. A method of converting CNSL aldehydes formed by a process as defined in any one of claims 1 to 8 to an adhesive by treatment with an acidic material in the presence of water to form an emulsion, and thereafter further treating with a base.
11. An adhesive composition formed from the product of a process as defined in any one of claims 1 to 8.
- 15 12. An adhesive composition according to claim 11 which is (i) produced by the treatment of CNSL aldehydes with an acidic material and/or (ii) formed by the treatment of CNSL aldehydes with a base.
- 20 13. An adhesive according to claim 12 which is formed by sequential addition of an acid and a base to CNSL aldehydes.
14. An adhesive according to claim 13 which is formed by the addition of p-toluene sulphonic acid to CNSL aldehydes, followed by the addition of solution of sodium hydroxide.
- 25 15. An adhesive according to any one of claims 11 to 14 in the form of a solution or dispersion in water.
- 30 16. A method of forming a composite from a particulate or fibrous material (e.g. a particulate or fibrous organic or inorganic material) comprising treating the material with CNSL aldehydes formed by a process as defined in any one of claims 1 to 8 and heating to form the composite, optionally with the application of pressure.

17. A method according to claim 16 wherein the material is an organic material such as a lignocellulosic material, for example selected from wood, straw, hemp, jute, flax, rice straw and maize.
- 5      18. A method according to claim 16 wherein the material is an inorganic material selected from inorganic particulates and fibres, such as charcoal, marble (e.g. crushed marble), crushed rock, clay, coal, slate and glass, e.g. fibre glass.
- 10     19. A composite formed from a resin and a particulate and/or fibrous material (e.g. a particulate material and/or fibrous material as defined in any one of claims 16 to 18) wherein the resin is derived from the product of the ozonolysis and subsequent reductive cleavage of CNSL.
- 15     20. A composite according to claim 19 wherein the resin is an adhesive as defined in any one of claims 11 to 15.
21. A composite according to claim 19 or claim 20 which is a wood particle board.